



## Floods, hurricanes and climate: Influences on the Potomac River Basin

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### Abstract:

The suggestion from preliminary analysis of data derived from stream gauges in the Potomac River Basin is that tropical storm types generate many of the high magnitude flood events in the Potomac River Basin. The goals of this study are to 1) determine whether or not tropical storms are, in fact the primary cause of extreme floods, 2) determine whether tropical-storm characteristics, e.g., landfall location and wind speed, or climatic conditions can be used to predict extreme floods in the Potomac River Basin; and 3) evaluate the flood potential of sequential tropical storms by comparing the flood response to a single September tropical storm event (Isabel, 2003) with the flood response to a series of four September tropical storm events in 2004. All assessments utilized thirty-seven stream gauge discharge records and archival data on named tropical storm characteristics for the period 1950 to 2004. The data were used in logistical regression to establish the importance of tropical storms in flood generation. Models of the relationship between tropical storm characteristics, climatic factors, including the Atlantic Multi-decadal Oscillation and Pacific Decadal Oscillation; and annual peak discharge were developed using generalized linear modeling. Western Potomac River Basin flood responses to Hurricanes Isabel (2003), Ivan and Jeanne (all in 2004) were evaluated based on hydrograph and runoff characteristics. Antecedent moisture and soil moisture storage capacity, during the four storms, were also assessed using discharge data. Tropical storms and frontal storms generate most of the floods in the upper 10% of flood distributions for study. Generalized linear modeling indicates the Pacific Oscillation Index and atmospheric pressure associated with the tropical storm play a key role in the storm's ability to generate a flood. It was also determined that a single intense storm, such as Hurricane Isabel (2003), is a better flood generator than a series of closely spaced storms, such as the series of tropical storms in 2004.

**Source:** <http://hdl.handle.net/1903/9192>

### Resource Description

#### Exposure :

weather or climate related pathway by which climate change affects health

Extreme Weather Event

**Extreme Weather Event:** Flooding, Hurricanes/Cyclones

#### Geographic Feature:

resource focuses on specific type of geography

# Climate Change and Human Health Literature Portal

Freshwater

## **Geographic Location:**

resource focuses on specific location

United States

## **Health Impact:**

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

## **Mitigation/Adaptation:**

mitigation or adaptation strategy is a focus of resource

Adaptation

## **Resource Type:**

format or standard characteristic of resource

Research Article

## **Timescale:**

time period studied

Time Scale Unspecified

## **Vulnerability/Impact Assessment:**

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content